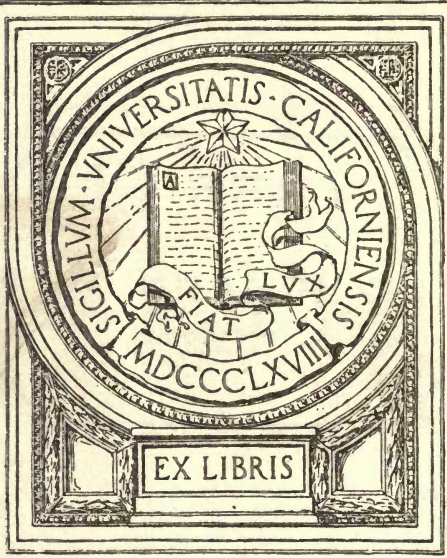


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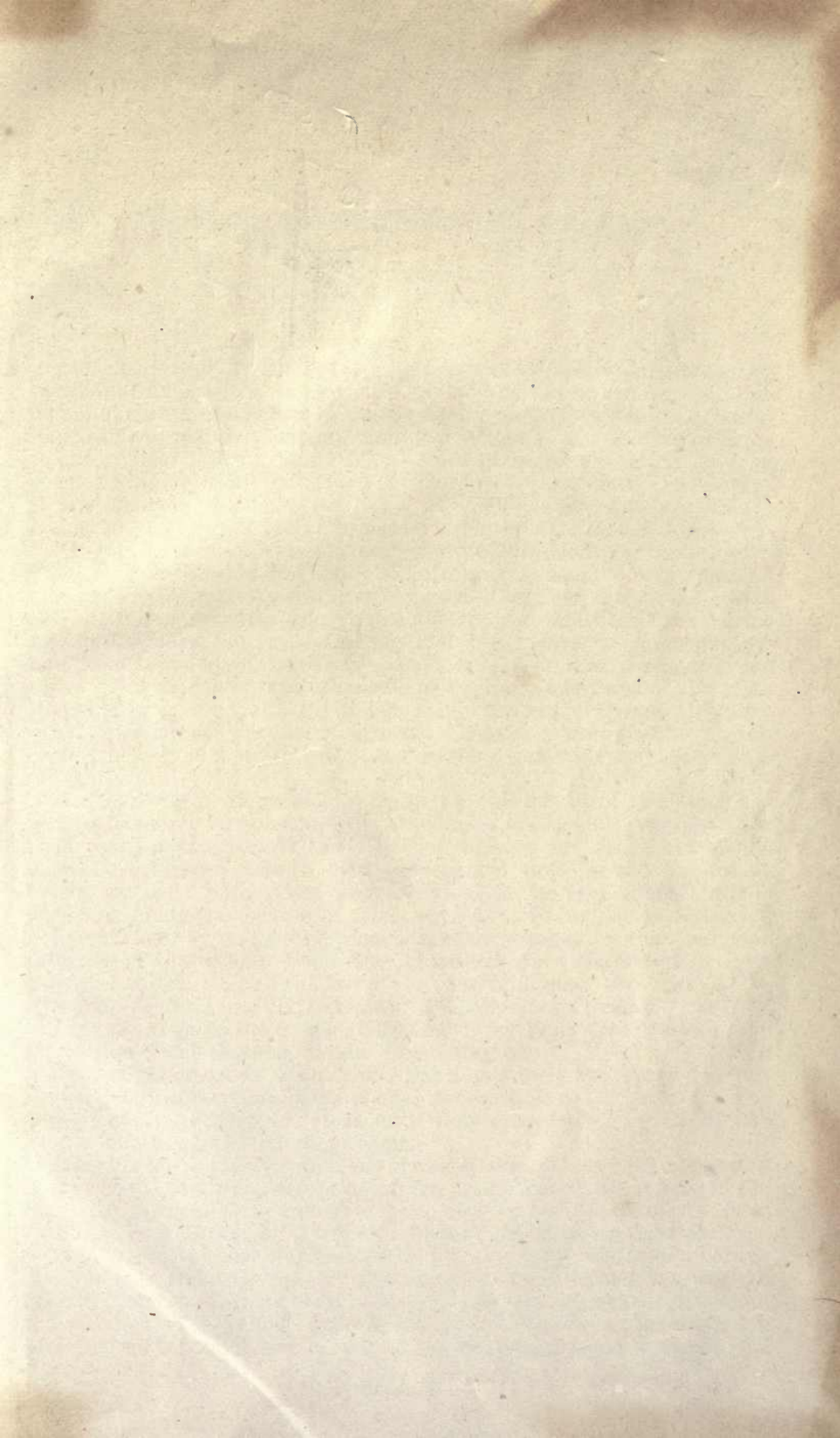


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THE FLORA OF SOUTHWESTERN COLORADO.

BY T. S. BRANDEGEE.

Attached to the division of the San Juan as assistant topographer, as much time as possible was given to the botany of the country through which our work obliged us to pass. Under such circumstances, it was impossible to make a complete botanical collection of the district given to our division; therefore no plants were gathered excepting such as seemed to be additions to the flora of Colorado, as published by the Survey in Miscellaneous Publications, No. 4. The collections and notes were almost all made while riding from one topographical station to another.

Early in June we left Pueblo for Southwestern Colorado, via the Mosca Pass, over the Sangre de Cristo. The country was alive with innumerable grasshoppers, busy eating every green thing excepting the leaves of *Juniperus occidentalis* and the cactus-plants. *Opuntia Missouriensis* was in full bloom, and early in the morning, before the grasshoppers had breakfasted upon the newly-opened flowers, presented a magnificent sight. We rode over mile after mile of the Saint Charles and Huerfano Plains, now covered with the red or yellow flowers of *Opuntia Missouriensis*. The mesas, variegated with the different-colored patches of this cactus, presented a striking contrast to their generally dry, barren appearance.

The thickets of *Shepherdia argentea* on the banks of the Huerfano and its tributary streams, and the abundance of *Abronia fragrans* upon the mesas, at once attract the attention of any one familiar with the flora of Northern Colorado. Up the eastern slope of the Sangre de Cristo we meet with *Abies Douglasii*, and at the very summit of the pass find a long-leaved tree of *Abies concolor*. *Pinus flexilis*, scattered here and there by its twisted branches, bears witness to the prevalent direction of the winds. Some fine old trees of *Abies concolor* grow along the little stream which runs down the pass, and near the base of the mountain descend into the habitat of *Pinus edulis*. A camp at the foot of the pass close to the dunes affords an opportunity for examining the vegetation about those mountains of drifting sand. Nothing, not even a blade of grass, grows upon them; but along their base some *Triticum repens*, *Thermopsis*, *Astragalus pictus*, *Psoralea*, have a foothold. The willows continue along the creek until they are almost buried by the sand which has collected about them.

From here to the Rio Grande, the dry level country is very uninteresting botanically. With the exception of the banks and alkaline flats of the lakes, for thirty or forty miles we pass through a Lilliputian forest of *Bigelovia*, *Sarcobatus*, and *Atriplex*. Beds of *Heliotropium Curassavicum*, with their pretty white flowers now in full bloom, are scattered over the alkaline flats about the lakes. The sandy beaches of the lakes are the favorite habitat of *Nasturtium sinuatum*. In September, the banks of the streams were yellow with *Bidens chrysanthemoides*, and upon the surrounding plains *Cleome Sonora*, with *Aplopappus lanceolatus*, grew in

abundance. These plants, so common about the lakes, were seen in no other place during our summer's explorations.

Up the Rio Grande, as far as to fifteen miles above Del Norte, nothing of interest was noticed; there we first meet with *Berberis Fendleri*, which, after we had crossed the main range, was found quite as plenty upon the western slope.

Wagonwheel Gap, through which the waters of the Rio Grande have barely room to find their way, is a cañon of magnificent beauty, and is very interesting botanically. Although only 8,000 feet above sea-level, *Cryptogramme achrosticoides* flourishes among the loose rock. On the face of the cliffs and among the *débris* at their base, a new *Gilia*, *G. Brandegei*, Gray, was found growing in abundance. But for its yellow flowers, it would have been passed by as *Polemonium confertum*, var. *mellitum*, which it almost exactly imitates in leaves and fragrant viscosity.

At the head of Los Pinos Creek we leave the Rio Grande, cross the Sierra Madre, and come upon the western slope of the Rocky Mountains. The alpine and subalpine floras at this southern latitude are almost exactly the same as those of Northern Colorado. *Pachystima Myrsinites* and *Erythronium grandiflorum* are very common, and *Aquilegia Canadensis* almost entirely takes the place of *A. cærulea*. Among the common species of *Senecio*, *Sedum*, *Pedicularis*, &c., but two additions to the flora of Colorado were noticed: *Arenaria saxosa* of New Mexico and *Corydalis Caseana* of the Sierra Nevada. To find these plants growing with species of so northern a habitat as *Calypso borealis*, *Listera cordata*, and *Aspidium Filix-mas* was very interesting. The *Corydalis* prefers the banks of the little mountain-streams and cold springs in the shade of the forests of *Abies Engelmanni* and *grandis*. Here it reaches a height of 5 feet; the finely-dissected leaves are 2 feet and more long, forming a very handsome foliage-plant, but its blue-tinged flowers lack clearness of color.

In the valleys of the Los Pinos, Florida, and Animas, at about 7,000 feet altitude, the first decided change appears in the flora. Plants not before known to exist in Colorado become common, and in some places form the greater part of the vegetation. Bushes of *Fendlera rupicola* 10 feet high grow upon the bluff-sides; thickets of *Peraphyllum ramosissimum* are very plenty, now full of its long-stemmed fruit called by the few white settlers wild crab-apple. Conspicuous among the plants which mark the change in the flora are *Rhamnus Californicus*, *Hosackia*, *Yucca baccata*.

Southwestern Colorado, an extent of country of very different altitudes, and embracing within its limits various conditions of soil, moisture, &c., of course has a varied flora. The flora of the alpine and subalpine regions of the Sierra La Plata, the only high mountains in our district, like that of the Piedra and Los Pinos Mountains, is similar to that of equal altitudes in Northern Colorado.

To the alpine flora, the only addition is a bright-pink clover, named by Mr. Watson *Trifolium Brandegei*. The subalpine flora compared with that of the eastern slope has a greater abundance of *Rubus Nutkanus*, *Pyrus sambucifolia*, *Prosartes trachycarpa*.

The Mesa Verde, a plain of two hundred square miles, raised nearly 1,000 feet above the surrounding country, is a prominent topographical feature of Southwestern Colorado. Its surface is perfectly dry; the showers from the La Plata Mountains rarely wetting it except upon the northern edge. *Juniperus occidentalis* covers almost the whole mesa, and it is to the abundance of this un-

graceful, bushy tree that the name Green Mesa is due. The piñon is scattered here and there, sometimes covering quite an area, especially where the sandstone does not reach the surface. Very rarely, upon a rocky ledge, is seen a solitary tree of *Juniperus Virginiana*. The trails over the Mesa Verde, some of them evidently very old, generally cross the small parks and follow up openings in the juniper-forest. The sage-bush (*Artemisia tridentata*) covers these parks so thickly that they are almost impassable excepting by the narrow trail, so narrow that as we ride along the encroaching *Artemisia* is continually brushing against us. The yellow flowers of *Helianthus petiolaris* and *lenticularis*, of *Actinella Torreyana* and *Richardsonii*, the delicate pink blossoms of *Mamillaria vivipara*, the light blue of *Pentstemon linarioides*, and the hooked spines of *Echinocactus Whipplei* sometimes are seen; but, after having crossed the Mesa Verde, one has the impression that its vegetation is all juniper and sage-brush. There is a great difference between the vegetation of the northern slope and cañons (altitude 8,000 feet) and that of the southern edge (altitude 6,000 feet), due mainly to the lower altitude and smaller rain-fall of the southern portion. The northern portion is covered with a luxuriant growth of *Peraphyllum*, *Fendlera*, *Purshia tridentata*, *Cercocarpus parvifolius*, *Amelanchier alnifolia*, *Quercus*, and *Yucca baccata*, while the southern portion has only a growth of *Purshia*, *Cowania*, *Ephedra*, and *Fraxinus anomala*.

The valley of the San Juan really comprises the whole extent of country of the southwest explorations; but as the term is applied to the habitat of plants of the collection, it is limited to a district north of the river about twenty miles wide. The San Juan River was followed from the mouth of the Rio La Plata (5,300 feet altitude) in New Mexico, along its course into Utah, twenty miles from the Colorado line (4,300 feet altitude). All plants of the San Juan Valley of New Mexico come into the limits of Colorado about the mouth of the Mancos, where the San Juan barely touches the corner of Colorado. Some of the species seen only in Utah may not enter the limits of Colorado; but their number is small, less than a dozen. The San Juan Valley is even drier than the Mesa Verde; the soil is perfectly dry close up to the water of the river. The bottom-lands are generally less than one mile wide, and produce quite a growth of plants, which send their roots down in the earth to the level of the water of the river. The course of the Rio San Juan can be distinctly seen long before we reach its banks; it is a line of green a mile wide and many miles in length, winding through the gray desert. Groves of large cottonwood are scattered along its course, and dense thickets of *Shepherdia argentea*, *Cratagus coccinea*, and *Salix longifolia* line its banks. The fragrance of the Bigelovias and other plants is noticeable at a distance of two or three miles; and as we return in the evening after a ride over the dry, barren plains, the delightful odor filling the air announces the proximity of the river long before we reach it. The mesas of the San Juan Valley are very barren of vegetation. The handsome *Eriocoma cuspidata* is sometimes plenty enough to afford a night's pasturage for the mules, and, compared with the general scarcity of growth, *Pleuraphis Jamesii* often seems plenty. There are large areas with absolutely nothing growing upon them, and often, even along the streams, our day's journey would be lengthened four or five miles before grass could be found sufficient for a camping-place. The alkaline flats abound in *Chenopodiaceæ*, mainly *Sarcobatus*, *Atriplex Nuttallii* and *confertifolia*.

Where Mount Elmo and Montezuma Creeks, dry streams from the north, come down to the San Juan, we find many interesting plants.

Symmetrical clumps of *Calamagrostis longifolia* 6 feet high, their large panicles bending gracefully outward, send their roots deep down into the dry sand.

Rings of *Muhlenbergia pungens* are scattered over the flats here and there. This grass spreads by underground stems, which grow continually outward, the older inner part dying and disappearing, leaving the bare sand surrounded by a circumference of living green. These centrifugal circles are sometimes 10 feet in diameter, with the interlaced purple panicles of the ring a foot wide. The rare *Oxytenia acerosa*, with *Bigelovia Wrightii*, *Heliotropium convolvulaceum*, *Dicoria Brandegei*, *Andropogon Torreyana*, are some of the plants common in these dry rivers. When we ride up these rivers of sand, sometimes a bright, green cottonwood, or *Negundo*, is met with, showing that water must be down deep somewhere. How they managed to exist before their roots reached moisture is an interesting question. El Late and Cariso, groups of low mountains about 9,000 feet in altitude, produce a flora similar to one another and very different from that of the plains from which they rise. *Pinus edulis* and *Juniperus occidentalis* cover Cariso, and grow nearly upon the summit of El Late. The characteristic vegetation is the same as that of the La Plata and Animas of the same altitude.

Upon the eastern slope of the Rocky Mountains, in the valley of the Arkansas, the *Cactaceæ*, on account of their abundance and size, are a prominent part of the vegetation. It was expected that the southern latitude, low altitude, and dryness of Southwestern Colorado, with its proximity to the cactus region of Arizona, would be favorable to the growth of *Cactaceæ*, but the number of species is less than in the Arkansas Valley, and the number of plants is very small. Only two species to be added to the flora of Colorado make their appearance: an *Echinocactus* and a *Cylindropuntia*. The *Cylindropuntia* is found at altitudes between 7,000 and 8,000 feet, and *Echinocactus Whipplei* generally does not grow in the lowest altitudes, so that the country along the San Juan River has not a single additional species of cactus, and lacks very nearly all the species of the eastern slope. The great beds of *Opuntia Missouriensis* which cover the plains and parks of the eastern slope are not found in Southwestern Colorado; neither *Opuntia arborescens* nor *Cereus viridiflorus* was seen, and no species is common.

The genus *Astragalus* is represented by few species, and these are not very abundant. They grow almost wholly above 6,000 feet altitude. None of the species of *Astragalus* of Southwestern Colorado, with the exception of *A. lonchocarpus*, appear upon the eastern slope. Twelve leguminous plants were found which grow in Eastern Colorado, while not more than eight species common to the plains of both eastern and western slopes were seen. Few of the *Leguminosæ* are very abundant.

The shrubby *Rosaceæ* are in strong force and characteristic of the flora of Southwestern Colorado from high to low altitudes. The species common to both eastern and western slopes, the abundance of some which rarely grow upon the eastern slope, together with those species which here enter the limits of Colorado, give great prominence to the rosaceous shrubs.

The genus *Eriogonum* is well represented in species, and the plants are very abundant, especially those of the annuals. Nine annual species grow in the San Juan Valley; in the Arkansas Valley but three are found, and in Northern Colorado but one.

At about 8,000 feet altitude, the common oak of Colorado is very abundant, growing upon the bluff-sides and becoming a small tree in moist locations. At lower altitudes, it is rarely seen, and is a small bush

about two feet high, with small, somewhat sharply-lobed, leaves. The forms so common in the Greenhorn range, bearing small, nearly evergreen leaves, do not grow in Southwestern Colorado.

The subalpine *Coniferae* of the southwestern slope are mainly *Abies Engelmanni* and *grandis*. These two species, either together or in forests of one alone, cover the western slope down to the altitude of *Pinus ponderosa*, 9,000 feet. Both species become large, magnificent trees. *Abies Engelmanni* is the only conifer found at timber-line, but *A. grandis* reaches very nearly to as high an altitude. *Abies Menziesii* is confined mainly to the vicinity of the water-courses between altitudes of 10,000 and 8,000 feet. *Abies Douglasii* is not very common, and grows between altitudes of 9,000 and 7,000 feet, descending into the region of *Pinus edulis* and *Juniperus occidentalis*. *Abies concolor* was not seen upon the western slope, and not a tree of *A. grandis* could be found upon the eastern slope. The range of *Abies concolor* in Colorado is southward from the Ute Pass and Manitou (6,000 to 7,000 feet altitude); in the cañons of the Greenhorn range, to the summit of Lucille Hill, Rosita, 1,000 feet, along the Sangre de Cristo and Raton Mountains to New Mexico. *Pinus ponderosa* in Southwestern Colorado is abundant at 8,000 feet altitude, and its large trees will furnish a great amount of lumber. *Pinus flexilis* is not common; it grows at an altitude of 8,500 feet with *Pinus ponderosa*, *Abies grandis*, *Menziesii*, *Engelmanni*, and *Douglasii*, all associated at this altitude. *Pinus edulis* and *Juniperus occidentalis* cover the mesas and mountains below 7,500 feet altitude. The piñon often grows in company with *Pinus ponderosa* and *Abies Douglasii*, and in the Arkansas Valley grows above the lower altitudes of *Abies concolor* and *Menziesii*. Last year *Juniperus occidentalis* and *Virginiana*, *Abies concolor*, and *Pinus ponderosa* matured quantities of fruit, and probably the other *Coniferae* also did; but this year, wishing to collect seeds, I was unable to find any, and am sure that the *Coniferae* of Southern Colorado matured no fruit. *Pinus edulis* is said to fruit once in seven years, and it certainly sometimes fruits in such abundance that the nuts are collected by the Mexicans in quantity.

Southwestern Colorado having never been the residence of the white man, those plants which become introduced with eastern seeds have not yet made their appearance. *Xanthium strumarium* has been probably introduced upon both eastern and western slopes. Upon the eastern slope it is said to have come from Texas with the importation of cattle, the burrs clinging to their hair and becoming everywhere distributed. Upon the western slope it perhaps was introduced from the south by the cattle, sheep, and goats of the Indians. It is not as common as upon the eastern slope, but will become so when farmers, like those of the eastern slope, begin to irrigate the land. *Xanthium* must have a location where its roots can reach wet ground, and prefers the banks of irrigation-ditches, where, in company with other troublesome plants, it is permitted to grow to perfection, and its seeds spread over the cultivated fields. The corn-fields of the band of Utes about El Late are not irrigated and are free from introduced weeds, having very few of any sort. The corn is planted in hills without any regularity; the roots striking down to moisture soon, they are but slightly dependent upon showers from El Late. The most noticeable plants growing among the corn were *Nicotiana attenuata* and *Convolvulus sepium*. The edges of the field produced a fine growth of those species of *Helianthus* which so rapidly increase in number with the irrigation and cultivation of the soil. *Helianthus petiolaris* and *lenticularis* are now sparingly found in Southwestern

Colorado, but, when the valleys of the streams are cultivated, will become as plenty and as troublesome as upon the eastern slope. The vegetation of the valleys of Southwestern Colorado was free from the effects of irrigation, cultivation, and large herds of cattle and sheep, all of which rapidly produce great changes.

As before mentioned, the flora of Southern and Southwestern Colorado above timber-line is nearly the same as the alpine floras of Central and Northern Colorado. From timber-line (11,000 to 12,000 feet altitude) down to 8,000 feet altitude, the effects of latitude and longitude are barely noticeable upon the flora. As we approach New Mexico, but very few plants of a more southern habitat appear, and very few of those common in Northern Colorado are absent. The western slope produces very few plants of a more western habitat until altitudes below 8,000 feet have been reached. Below this altitude are found the somewhat distinct floras of the different parts of Colorado. The flora below 8,000 feet, north of the divide between the Platte and Arkansas Rivers, is in greater part found southward in the parks and valleys along the base of the mountains. It contains the greater number of species of *Astragalus*, thirty species growing, where, upon an equal area southward and westward, not more than half a dozen can be found. As we cross the divide and come into the valley of the Arkansas, a difference in the aspect of the vegetation is at once noticed. This is the cactus-center of Colorado. *Mentzelia* is magnificently represented by seven species. The *Nyctaginaceæ* are nearly as well developed as in Southwestern Colorado, while *Solanaceæ* and *Euphorbiaceæ* are much better represented. Many plants of southern habitat, as *Zinnia*, *Melampodium*, *Ximenesia*, *Tricuspis*, &c., become quite conspicuous, and many stragglers of the south here grow in their most northern location. San Luis Valley, an elevated plain (7,000 to 9,000 feet altitude), does not possess the different conditions necessary to the growth of an extensive flora. The alkaline flats produce an abundance of *Chenopodiaceæ*.

Many interesting plants undoubtedly grow along the boundaries of the park and the edges of the mountains. Its southern portion on the Rio Grande (altitude 7,000) has, in a very limited degree, the appearance of a New Mexican flora. The number of the phænogamous plants growing in Southwestern Colorado will not equal the 900 species that can be found upon any similar area upon the eastern slope. The impressions received by any one who has noticed the flora of the eastern slope, riding rapidly over Southwestern Colorado, below 8,000 feet altitude, are, the great scarcity of all vegetation; the comparative abundance of rosaceous shrubs, and *Artemisia tridentata*; the great number of the annual species of *Eriogonum*; the showy blossoms of *Malvaceæ*; the few species of *Astragalus* and *Pentstemon*.

LIST OF PLANTS OF COLORADO NOT MENTIONED IN THE SYNOPSIS OF THE
FLORA OF COLORADO, MISCELLANEOUS PUBLICATIONS, No. 4.

Thanks are due to Dr. Asa Gray for descriptions of new species and determinations of many plants of the collection; to Dr. George Engelmann for his descriptions of new species and determinations of *Cactaceæ*, *Loranthaceæ*, and species of other orders; to Mr. S. Watson for determinations; to Prof. Thomas C. Porter for determinations of plants from the vicinity of Cañon City; and to Prof. D. C. Eaton for herbarium facilities and assistance; to Mr. Eugene A. Rau for the list of *Musci* and *Hepaticæ*; and to Mr. J. H. Redfield for much assistance.

RANUNCULUS RHOMBOIDEUS, Goldie.

Sierra La Plata, 10,000 feet altitude.

BERBERIS FENDLERI, Gray, Plant. Fendl., p. 5.

Valleys of the Rio Grande, Animas, and Mancos.

CORYDALIS CASEANA, Gray, Proc. Am. Ac., x, 69.

Piedra Mountains, 10,000 feet altitude.

NASTURTIIUM TRACHYCARPUM, new species.

E radice annua? erectum (pedale), ramosum, fere glabrum; foliis lyrato-sub-pinnatifidis; racemis laxis; floribus albidis; petalis spathulatis sepala antherasque oblongo-sagittatas parvum superantibus; siliquis oblongo-linearibus (lin. 4-5 longis) papilloso-asperatis in pedicello rigido mox recurvato adscendentibus stylo longo subulato superatis.

The rhachis and stout pedicels are studded with the small and rough papillæ which abound on the pod, and suggest the name of this very distinct species.—ASA GRAY. Southwestern Colorado.

STREPTANTHUS CORDATUS, Nutt.

Mesa Verde, growing under *Juniperus occidentalis*, 6,500 feet.

THELYPODIUM INTEGRIFOLIUM, Endl. var.?

Flowers white; racemes much longer and pod more stipitate. Common in the San Juan Valley.

DRABA AUREA, var. *stylosa*, Gray.

Wagonwheel Gap, on the Rio Grande.

BRASSICA.

San Juan Pass, 10,000 feet, introduced.

BISCUTILLA (DITHYREA) WISLIZENI, Englm.

Valley of the San Juan, 4,500 to 6,000 feet altitude.

CLEOME AUREA, Nutt.

Valleys of the San Juan and Mancos, 5,500 feet altitude.

CLEOME SONORÆ, Gray, Pl. Wright, p. 16.

San Luis Valley.

CLEOMELLA OÖCARPA, Gray, new species, Proc. Am. Acad., xi, 72.

Diffusa, spithamæa ad sub-pedalem; foliolis oblongo-linearibus; racemo sæpissime densifloro; bracteis inferioribus foliis conformibus, superioribus simplicibus; setulis stipularibus manifestis; staminibus petala superantibus; ovario apice 3-ovulato; capsula ovata lineam longa stylo breviusculo superata stipite (pedicellum subæquante) triplo brevior; seminibus 1-2 levibus.

Very abundant on the adobe hillsides and alkaline flats on the borders of the Mesa Verde about the Rio Mancos. Collected also in Nevada by Drs. Torrey and Gray.

SILENE ANTIRRHINA, L.

Mountains about Cañon City, 6,000 feet altitude.

ARENARIA SAXOSA, Gray, Pl. Fendl., p. 13.

Piedra and Los Pinos Mountains, 10,000 feet; Parrott City and banks of the La Plata to 6,000 feet altitude.

PORTULACA RETUSA, Englm., Pl. Lindn., 2, p. 154.

Arkansas Valley and Southwestern Colorado.

MALVASTRUM LEPTOPHYLLUM, Gray, Pl. Wright, p. 17.

Valleys of the San Juan and La Plata.

SPHÆRALCEA EMORYI, Torrey, Pl. Wright, 1, 21.

Valleys of the San Juan, La Plata, and Mancos.

THAMNOSMA TEXANUM, Gray.

Soda Spring Ledge, Cañon City, 5,400 feet altitude.

GLOSSOPETALON SPINESCENS, Gray, Pl. Wright, ii, 29.

Near Hovenweep Castle, 5,250 feet altitude.

RHAMNUS (FRANGULA) CALIFORNICUS, Esch.

Valley of the Animas, 6,500 feet altitude.

POLYGALA ACANTHOCLADA, Gray, new species, Proc. Am. Acad., xi, p. 73.

Fruticulosa, bipedalis, ramosissima, subcinereo-pubescent, spinis gracilibus armata; foliis lineari-spathulatis rigidulis (lin. 3-4 longis); floribus subaxillaribus sparsis albidis lin. 2 longis pedicello basi bibracteato parum brevioribus; alis obovatis sepalis cæteris duplo majoribus corollam adæquantibus; carina breviter cymbiformi nuda dorso umbonata.

Growing upon a bluff side near the San Juan River in Utah, not far from the Colorado boundary.

LUPINUS SILERI, Watson.

Trail between Parrott City and the Mancos, 7,500 feet altitude.

LUPINUS SITGREAVII, Watson, Proc. Am. Ac., viii, 527.

Common in Southwestern Colorado, 7,000 feet altitude.

TRIFOLIUM ERIOCEPHALUM, Nutt.

Lost Cañon and Parrott City, 8,600 feet altitude.

TRIFOLIUM BRANDEGEI, Watson, new species, Proc. Am. Ac., xi, p. 130.

Dwarf, perennial, caespitose, and acaulescent, glabrous, the inflorescence slightly villous; stipules scarious; leaflets elliptic-oblong, thin, acutish, entire, a half to an inch long; peduncles about equaling the leaves; flowers spicate in a loose naked head, purplish, seven lines long; calyx-teeth lanceolate, acuminate, a little longer than the campanulate tube; ovary stipitate, 7-ovuled.

A very showy species, common in the Sierra La Plata.

HOSACKIA WRIGHTII, Gray, Plant. Wright, p. 42.

Southwestern Colorado, 8,000 feet altitude.

DALEA LANATA, Spreng.

Valley of the San Juan, 6,000 to 4,000 feet.

PETERIA SCOPARIA, Gray, Pl. Wright, p. 50.

La Plata Valley.

ASTRAGALUS DIPHYsus, Gray.

Southwestern Colorado, 6,000 feet.

ASTRAGALUS BIGELOVII, Gray.

Valley of the Mancos, 5,000 to 6,000 feet.

ASTRAGALUS SUBCOMPRESSUS, new species.

A. racemoso sect. *Galegiformium* admodum similis; dentibus calycis brevioribus; corolla ochroleuca; legumine falcato lateraliter compresso

intus septo completo bilocellato, sulco dorsali angusto subclauso, stipite e calycis tubo haud exserto.

Legumes an inch and a quarter or shorter in length, $2\frac{1}{2}$ to 3 lines wide, the well-developed ones decidedly falcate; the partition about twice the length of the depth of the groove, which in the cross-section before dehiscence is oval and almost closed.—ASA GRAY.

Animas Valley, 7,000 feet altitude.

ASTRAGALUS ROBBINSII, Gray, var. (?) *occidentalis*, Watson.

Animas Valley, 9,000 feet.

ASTRAGALUS HUMILLIMUS, new species.

Cæspitoso-depressus, condensatus; candice lignescens; caulibus vix pollicaribus stipulis scariosis coalitis imbricato-tectis, petiolis persistentibus hystricosis; foliolis 3-5 jugis oblongis canescentibus margine revolutis (lineam longis) demum deciduis; pedunculis brevibus 1-3 floris; calycis dentibus subulatis tubo oblongo-campanulato dimidio brevioribus; corolla pallida; legumine ovato-coriaceo albo-pubescente parvo (lin. 2 longo) uniloculari 9-ovulato fere monospermo, suturis extus prominulis.

Habit of *A. jejunus*, Watson, but much more dwarf and condensed; petioles and rhachis more spinescent and persistent; pod decidedly different.—ASA GRAY.

Growing upon sandstone-rock of the Mesa Verde, near the edge of the Mancos Cañon.

ASTRAGALUS HAYDENIANUS, new species.

A. bisulcato affinis, minor, pube magis cinerea; spica elongata virgata; floribus multo minoribus (lin. 3-4 longis); calycis dentibus subulatis tubo multo brevioribus; corolla alba, carina tantum apice purpureo-tincta; legumine ovali utrinque obtusissimo venis transversis ruguloso 6-7-ovulato 2-4-spermo, facie ventrali late profundeque impressa sutura costæformi valde prominente percussa, stipite calycem haud superante.

Also collected on Grand River, Middle Park, by H. N. Patterson. A striking species, with slender stems 2 or 3 feet high; dedicated to the director of the Survey, and one of the oldest, most indefatigable, and distinguished explorers of the whole Rocky Mountain region.—ASA GRAY.

The flowers of this species have the peculiar disagreeable odor of those of *A. bisulcatus*.

Southwestern Colorado, between Parrott City and the Mancos, 8,000 feet.

ASTRAGALUS PATTERSONI, new species.

*Scytocarp*i, robustus, 1-2-pedalis, adpresso-puberulus, nunc glabellus; foliolis 5-10-jugis oblongis crassiusculis (semipoll. ad pollicem longis); pedunculis racemoso-plurifloris folium æquantibus vel superantibus; floribus ultra semipollicaribus mox pendulis; calycis dentibus setaceo-subulatis tubo cylindræo dimidio brevioribus; corolla alba, carina apice nunc purpurascens; legumine ovali crasso-coriaceo inflato glabro (sæpius pollicari) polyspermo, basi intra calycem abrupte contracta substipitiforimi, suturis nec intrusis nec extus prominulis.

The only flowering specimens seen were collected by Mr. H. N. Patterson, for whom it is named, in the foot-hills of Gore Mountains, Colorado.

Fruiting specimens were also abundantly collected by L. H. Ward in Powell's exploration.—ASA GRAY.

Fruiting specimens only; collected in McElmo Valley, 5,500 feet altitude.

ASTRAGALUS ———.

An interesting species, collected in fruiting specimens only, grows about Navajo Springs, near Cariso Mountains, Arizona. Another uncertain species, growing upon the alkaline flats of the La Plata, was almost out of fruit in June.

OXYTROPIS PODOCARPA, Gray.

Sierra Sangre de Cristo, 12,000 feet altitude, and alpine summits of the mountains near Breckenridge.

PRUNUS DEMISSA, Walp.

Common upon both eastern and western slopes at 8,000 feet elevation.

COWANIA MEXICANA, Don.

Mesa Verde and its cañons; El Late, 6,000 feet.

COLEOGYNE RAMOSISSIMA, Nutt.

Near Hovenweep Castle, 5,250 feet altitude.

PERAPHYLLUM RAMOSISSIMUM, Nutt.

Valleys of the Animas, La Plata, and Mancos, 6,000 to 8,000 feet altitude.

CRATÆGUS COCCINEA, L.

Greenhorn Range of the Arkansas Valley and along the banks of all the streams and rivers of Southwestern Colorado.

CRATÆGUS RIVULARIS, Nutt (?).

Texas Creek, near the Sangre de Cristo, 8,000 feet.

POTENTILLA CRINITA, Gray, Pl. Fend., 41.

Thompson's Park, 7,500 feet.

HEUCHERA RUBESCENS, Torr.

El Late, 9,000 feet.

FENDLERIA RUPICOLA, Eng. & Gray, Pl. Wright, 77.

Valleys of the Animas, La Plata, and Mancos, Mesa Verde and Cariso Mountains.

TILLÆA DÆRUMMONDII, T. & G.

Rio Grande Valley.

CALLITRICHE VERNA, L.

Rio Grande Valley.

ÆNOTHERA BREVIPES, Gray, var. *parviflora*, Watson.

Sand-bar of the Rio Mancos, 5,000 feet.

ÆNOTHERA SCAPOIDEA, Nutt.

Alkaline flats, Cañon City Park, 5,500 feet.

MENTZELIA ORNATA, T. & G.

Common throughout the Arkansas Valley, from 4,000 to 6,000 feet altitude. The flowers are more than 6 inches in diameter, opening at twilight, about two hours later than those of *M. nuda*. When opening, they fill the surrounding air for some distance with fragrance. *M. multiflora*

also gives out the same delicious odor when the flowers at first open. It is often noticeable 100 feet from the plants.

MENTZELIA CHRYSANTHA, new species.

Biennis, ramosissima, caule albedo asperuto; foliis ovato-lanceolatis sinuato-dentatis, inferioribus versus basin angustatis, superioribus sæpius basi lata sessilibus; floribus subsessilibus bractealatis oppositifoliis; pomeridianis aureis, calycis laciniis lanceolato-subulatis tubo longioribus; petalis sub-10 lanceolatis acutis longe unguiculatis interioribus in stamina latiora abeuntibus; capsula cylindrica seu ovata; seminibus ovatis compressis anguste marginatis nec alatis.

Barren clayey limestone hills on the Arkansas, near Cañon City, with *Frankenia*, several shrubby *Atriplex*, *Juniperus occidentalis*, etc., where I discovered it in September, 1874; also in Southern Utah, Dr. Parry, 1874, No. 78, doubtfully referred to *M. multiflora*.

From the large, fleshy, branching, not fusiform root rise branching stems 1-2 feet high; leaves 1-3 inches long, $\frac{1}{2}$ -1 $\frac{1}{2}$ inches wide, more or less coarsely dentate, upper ones often entire; flowers 15-20 lines in diameter, open in the afternoon (and evening?); petals 6-9 lines long, 2-3 lines wide, often less than 10 in number, the innermost smaller and antheriferous; ovary with three placentæ, each bearing two series of ovules; capsule 3 lines wide, in some $\frac{1}{2}$, in others fully 1 inch long; seeds very narrowly margined, similar to those of *M. levicaulis*, but much smaller and not winged, surface faceted. Apparently near *M. pumila*, as described in Torr. & Gr. Fl. N. A., 1, 535, but that species is said to have small terminal flowers and winged seeds. Name from the golden-yellow color of the flowers, by which it is easily distinguished from the different cream-white species which grow in the same region. This color, however, gradually fades in drying, or becomes brown; this is also the case in the yellow flowers of *M. levicaulis*, while the flowers of *M. oligosperma* retain their color much better.—GEO. ENGELMANN.

ECHINOCACTUS WHIPPLEI, E. & B.

La Plata Valley and mesa Verde, 5,000 to 8,000 feet.

CEREUS CÆSPITOSUS; Eng., var. *castaneus*, Eng.

South of Pueblo, mesas of the Saint Charles.

OPUNTIA (CYLINDRO-PUNTIA)———?

Spreading over the ground; sometimes the small joints ascending to a height of 1 foot; flowers small, yellow; fruit yellow and unarmed. In flower about the 1st of July. Not determinable on account of the lack of mature seeds. La Plata Valley, Mancos, and McElmo, 6,500 feet.

ARALIA NUDICAULIS, L.

Ute Pass and Greenhorn Range.

SYMPHORICARPUS OREOPHILUS, Gray.

Mountains near Cañon City.

GALIAM ANGUSTIFOLIUM, Nutt.

Mancos Cañon and Cariso, 5,500 feet.

GALIAM BRANDEGEI, new species.

Cæspitoso-depressum, parvum, glabrum; radicibus fibrosis; foliis quarternis obovatis vel spathulatis fere eveniis, lin. 1-3 longis; pedunculis unifloris solitariis geministe nudis; flore albedo semilineam longo; fructu lævi glabro.

A diminutive species, hardly to be compared with any other of this country.—ASA GRAY.

Near the banks of the Rio Grande, where the Los Pinos trail begins to ascend the Sierra Madre. September.

BRICKELLIA LINIFOLIA, D. C. Eaton, King's Rep., p. 137.

Common in Southwestern Colorado.

BRICKELLIA MICROPHYLLA, var. *scabra*, Gray, Proc. Am. Ac., xi, 74.

Foliis parvulis rigidioribus papilloso-vel hirtello-scabris; pappo tantum 16-20-chæto.

Very common upon the sandstone-rocks of the Mesa Verde. Also collected by Dr. Parry.

ASTER NOVÆ-ANGLIÆ, L.

Cañon City.

ASTER PAUCIFLORUS, Nutt.

Growing about a warm soda-spring in the Animas Valley. In this species, the pappus separates readily from the achenium, with the bristles slightly connected at their base.

ASTER COLORADOENSIS, Gray, new species, Proc. Am. Acad., xi, 76.

MACHÆRANTHERA sed perennis, nanus, tomentuloso-canescens; caulibus in caudice lignescente confertis plurimis monocephalis; foliis imis spathulatis, summis fere linearibus, omnibus argute dentatis, dentibus spinuloso-setiferis; involucri hemisphærici squamis pluriserialibus subulatis laxiusculis; ligulis 35-40-linearibus purpureis elongatis; acheniis brevibus turbinatis creberrime cano-villosis.

Found in the mountains of Northern Colorado by nearly all collectors, and passed over as a form of a species of *Machæranthera*.

Southwestern Colorado, San Juan Pass, 12,000 feet altitude.

ERIGERON STENOPHYLLUM, var. *tetrapleurum*, Gray.

In rocky localities of the Mancos Cañon and Mesa Verde, 5,500 feet.

ERIGERON FLAGELLARE, Gray.

Cañon City and Southwestern Colorado.

ERIGERON BIGELOVII, Gray, Bot. Mex. Bound., 78.

Flats of the San Juan Valley, 5,200 feet.

TOWNSENDIA FENDLERI, Gray.

Wet Mountain Valley and Huerfano Creek.

TOWNSENDIA INCANA, Nutt.

Mesas of Southwestern Colorado.

TOWNSENDIA STRIGOSA, Nutt.

Flats of the San Juan Valley, 5,000 feet.

BIGELOVIA WRIGHTII, Gray.

San Juan Valley, 5,000 to 4,000 feet.

GRINDELIA MICROCEPHALA, DC.

Mancos Valley, 7,500 feet altitude.

APLOPAPPUS NUTTALLII, T. & G.

Mesas near Rio Mancos, 7,000 feet altitude.

APLOPAPPUS LANCEOLATUS, T. & G.

Near lake of San Luis Valley.

APLOPAPPUS ARMERIOIDES, Nutt.

Mesas of Southwestern Colorado, 7,000 feet.

APLOPAPPUS GRACILIS, Gray, Plant. Fend., 76.

Mancos Plains, 7,500 feet altitude.

BACCHARIS WRIGHTII, Gray, Plant. Wright, 101.

Soda Spring Ledge, Cañon City.

DICORIA BRANDEGEI, Gray, Proc. Am. Ac., xi, 76, new species.

Diffusa, pube substrigulosa cinerea; foliis lanceolatis obtusis subintegerrimis; capitulis laxe racemoso-paniculatis parvis; involucri squama interna florem femineum fulcrante unica cæteris hand longiore achenio oblongo turgido margine calloso-dentato subdimidio brevior.

An interesting accession to the genus, requiring considerable modification of the character.

Common along the San Juan, between McElmo and Recapture Creeks.

OXYTENIA ACEROSA, Nutt., Pl. Gambell, 172.

Very abundant in the dry gulches running into the San Juan at about 4,500 feet altitude.

ENCELIA FRUTESCENS, Gray, Proc. Am. Ac., viii, 657.

Rocky edges of mesas, Southwestern Colorado.

ENCELIA MICROCEPHALA, Gray, Proc. Am. Ac., viii, 657.

San Juan Valley, 4,500 feet.

HYMENANTHERUM (LOWELLIA) AUREUM, Gray, Plant. Fend., 89.

Cañon City, Colorado Springs, Pueblo, and on the Huerfano.

WYETHIA SCABRA, Hook., Proc. Am. Ac., viii, 655.

La Plata Valley, 5,000 feet; base of Cariso.

WYETHIA ANGUSTIFOLIA, Nutt.

Valley of Los Pinos Creek, 8,000 feet.

BALSAMORHIZA SAGITTATA, Nutt.

Mesas of La Plata and Los Pinos Creeks, 8,000 feet.

ACTINELLA TORREYANA, Gray.

Mesas of Southwestern Colorado—common.

HYMENOPAPPUS FLAVESCENS, Gray, Plant. Fend., 97.

San Juan Valley, 4,500 feet altitude.

HYMENOPAPPUS LUTEUS, Nutt.

San Luis Valley.

SCHKUHRIA INTEGRIFOLIA, var. *oblongifolia*, Gray, Proc. Am. Ac., ix, 199.

Hovenweep, McElmo—common—4,500 to 6,000 feet.

SCHKUHRIA NEO-MEXICANA, Gray, Pl. Fend., 96.

Rio Grande Valley, near Del Norte—plants small, not 2 inches high.

ARTEMISIA BIENNIS, Willd.

Near Cañon City and Parrott City.

ARTEMISIA BIGELOVII, Gray.

Abundant in the Arkansas Valley.

ANAPHALIS MARGARITACEA, R. Br.

La Plata Valley, near Parrott City.

GNAPHALIUM PALUSTRE, Nutt.

Parrott City and San Luis Valley.

MADIA GLOMERATA, Hook., Proc. Am. Ac., ix, 189.

Near Parrott City, 8,700 feet.

CNICUS PARRYI, Gray, Proc. Am. Acad., x, 47.

Parrott City, 8,400 feet.

STEPHANOMERIA EXIGUA, Nutt.

San Juan Valley, 5,000 feet altitude.

LACTUCA CANADENSIS, L.

Greenhorn range and mountains near Canon City.

PLANTAGO MAJOR, L.

Sandflats of the Mancos and Dolores, 7,000 feet—apparently indigenous.

PENTSTEMON BARBATUS, Nutt, var. *trichander*, Gray, Proc. Am. Acad., xi, 94.

Humilior e caudice lignescens; antheris longe parceque lanoso-barbatis!

A new variety of this handsome *Pentstemon*—Southwestern Colorado.

PENTSTEMON LINARIOIDES, Gray.

Southwestern Colorado, 6,000 to 7,000 feet.

PENTSTEMON BRIDGESII, Gray, Proc. Am. Ac., vii, 379.

El Late, 6,000 to 8,000 feet altitude.

ORTHOCARPUS PURPUREO-ALBUS, Gray.

Valleys of the La Plata and Mancos.

CORDYLANTHUS KINGII, Watson, King's Rep., 233.

San Juan Valley, 5,500 feet.

PEDICULARIS——.

A species common upon the Mesa Verde, growing under *Juniperus occidentalis*. Flowers and fruit not seen.

POLIOMINTHA INCANA, Gray, Proc. Am. Ac., 1870, 295.

San Juan Valley, 4,500 feet.

MARTYNIA PROBOSCIDEA, Glox.

Cañon City, 5,300 feet altitude.

ERITRICHIMUM CALIFORNICUM, DC.

Rio Grande Valley.

PHACELIA CRENULATA, Torr., Proc. Am. Ac., x, 318.

Rio Mancos, 5,300 feet altitude.

NAMA HISPIDA, Gray.

San Juan Valley, 5,000 feet.

GILIA (IPOMOPSIS) HAYDENI, Gray, new species, Proc. Am. Acad., xi, 85.

Fere glabra, e basi indurata perenni vel bienni paniculato-ramosissima, pedalis; foliis linearibus, imis vix spathulatis parce pinnatilobatis

dentatisve, ramealibus plerisque minimis subulatis integerrimis; paniculis subthyrsoides floribundis calycibusque parum glandulosis; corolla cæruleo-purpurea gracili infundibulari-tubulosa (ultra, semipollicari), tubo lobis suis ovatis calyceque 3-4-plo longiore; antheris oblongo-sagittatis subsessilibus fauci insertis; ovarii loculis 8-9-ovulatis; seminibus paucis oblongis, tegumento humectato nec spirillifero nec mucilagenoso!

A handsome species common upon the mesas of the Mancos, the western slope of the Mesa Verde, and about El Late, 5,000 to 7,000 feet altitude.

GILIA CONGESTA, Hook., var. *crebrifolia*, Gray.

McElmo Creek, 6,000 feet.

GILIA GUNNISONI, T. & G.

San Juan Valley, common.

GILIA BRANDEGEL, Gray, new species, Proc. Am. Acad., xi., 85.

EUGILIA, perennis, pube glandulosa fragrans viscosissima; caulibus erectis spithamæis vel subpedalibus thyrsifloris; foliis circumscriptione linearibus pinnatisectis, segmentis plurimis sessilibus parvis aut oblongo-linearibus rarius ovalibus integerrimis aut bipartitis verticillos 3-4-foliolatos simulantibus; corolla aurea infundibuliformi-tubulosa calyce cylindraceo semiquinquefido 2-3-plo longiore, fauce parum ampliata, lobis ovalibus brevibus; ovulis in loculis paucis.

A showy species, very common at Wagonwheel Gap on the Rio Grande, and also seen near the base of the Sierra Madre on the Los Pinos trail, eastern slope.

DATURA METELOIDES, DC.

Hovenweep Cañon, 5 miles above Hovenweep Castle. The large white flowers seemed wonderfully beautiful contrasted with the surrounding "greasewood and sage-brush".

LYCIUM PALLIDUM, Miers.

San Juan Valley—common.

CUSCUTA UMBELLATA, Kunth.

Hovenweep Cañon—parasitic upon *Portulaca retusa*.

ERYTHRÆA CHIRONIODES, Torrey.

Base of Cariso, Arizona.

FRASERA ALBOMARGINATA, Watson, King's Rep., 280.

Mesa Verde and San Juan Valley, 6,000 to 4,500 feet.

FRAXINUS ANOMALA, Torrey.

Mesa Verde, 5,700 feet; Hovenweep, 5,200 feet.

FORESTIERA ACUMINATA, Poir.

Banks of the San Juan.

ATRIPLEX POWELLII, Watson, Proc. Am. Ac., ix, 114.

Alkaline flats of the San Juan and Mancos.

ATRIPLEX NUTTALLII, Watson.

Southwestern Colorado.

ATRIPLEX CONFERTIFOLIA, Watson.

Cañon City and Southwestern Colorado.

GRAYIA BRANDEGEI, Gray, new species, Proc. Am. Acad., xi, 101.

Inermis, sesquipedalis, leviter furfuraceo-cinerea; foliis spathulato-linearibus; thecis minoribus flavidulis oblato-orbiculatis quandoque trialatis basi latissime retusis, alis subundulatis; ovario basilari papuloso.

Found only at the most western topographical station, San Juan Valley, 3,200 feet.

ALTERNANTHERA LANUGINOSA, Torrey.

Pueblo and San Juan Valley.

AMBLOGYNE TORREYI, Gray, Proc. Am. Acad., 5, 169.

Cañon City.

ASCLEPIAS INCARNATA, L.

Cañon City.

POLYGONUM CONVULVULUS, L.

Colorado Springs—introduced.

POLYGONUM HARTWRIGHTII, Gray, Proc. Am. Acad., 1870, 249.

Cañon City.

POLYGONUM COARCTATUM, Dougl.

Parrott City.

ERIOGONUM INFLATUM, Torrey.

San Juan Valley—common.

ERIOGONUM SALSUGINOSUM, Hook.

San Juan Valley—common.

ERIOGONUM DIVARICATUM, Hook.

San Juan and Mancos Valleys.

ERIOGONUM THOMASII, Torrey.

Southwestern Colorado.

ERIOGONUM RENIFORME, Torrey.

Southwestern Colorado.

ERIOGONUM ACAULE, Nutt.

San Juan Valley.

ERIOGONUM RACEMOSUM, Nutt.

Common at 8,000 feet in Southwestern Colorado.

ERIOGONUM CORYMBOSUM, Benth.

Slopes of the Mesa Verde.

ERIOGONUM CORYMBOSUM, var. *divaricatum*, T. & G.

Slopes of the Mesa Verde.

ERIOGONUM MICROTHECUM, Nutt., var. *confertifolium*, Benth.

Southwestern Colorado.

ERIOGONUM MICROTHECUM, var. *leptophyllum*, T. & G.

Southwestern Colorado—common.

ARCEUTHOBIUM DIVARICATUM, Englm.

Cariso and Mancos Mesas, 6,000 feet—parasitic upon *Pinus edulis*.

PHORADENDRON JUNIPERINUM, Englm.

Cariso Mountains—parasitic upon *Juniperus occidentalis*—6,000 feet altitude.

EUPHORBIA DENTATA, Mx.

Cañon City.

EUPHORBIA SERPYLLIFOLIA, Pers.

Wet Mountain Valley.

EUPHORBIA STICTOSPOREA, Engelm. in Bot. Mx. Bound., p. 187; Boiss. in DC. Prod., 15, 2, p. 41.

Abundant on the saline flats about Cañon City (Brandeggee).—This common New Mexican species is thus shown to extend into Southern Colorado. It is a prostrate annual, readily known by its pubescence, which extends to the sharp angled capsule. It has rounded, subcordate, sharply serrate leaves; lateral, leafy, crowded racemes, with very small and slender long-peduncled involucre and slender sharply 4-angled rugose-dotted seeds, which are about as long as the involucre itself (about 0.6 lines long). The styles are short and undivided.—GEO. ENGELMANN.

EUPHORBIA FLAGELLIFORMIS, new species.

Annua, glaberrima; caulibus e basi pluribus ramosissimis declinatis seu decumbentibus; foliis breviter petiolatis e basi subinæquali lineari-bus subacutis mucronulatis integris; stipulis triangulari-lanceolatis inferioribus connatis superioribus distinctis; involucri solitarii pedicello æquilongo fultis late campanulatis intus hirtulis polyandris, lobis triangularibus glandulas 2-4 parvas concavas angustissime appendiculatas æquantibus; stylis brevibus erectis bifidis; capsula depressa trisulca; seminibus lævibus cinereis trigonis acutis. *E. petaloidea*, δ . *flagelliformis*, Englm. Bot. Mex. Bound., p. 185. *E. zygophylloides*, γ . *flagelliformis*, Englm. in Boiss. Euph. DC. Prod., 15, 2, p. 29.

Originally sparingly collected without fruit on the Rio Grande, near El Paso, by Charles Wright.

This species, as it now proves to be, was abundantly seen on the sandy flats of the San Juan River, in Southwestern Colorado, by Mr. Brandeggee, where it occurs with the allied *E. petaloidea*, but unfortunately it seemed to be too common to make specimens of!

Stems 6-12 inches long; leaves 6-9 lines long, $\frac{1}{2}$ to 1 line wide; involucre about $\frac{3}{4}$ line wide; seeds of same length.—Readily distinguished from the allied *E. petaloidea* by the smaller involucre bearing very small and almost naked glands, often less than four in number, the more numerous stamens (often up to 25) with much smaller anthers, and by the smaller, more angular and more pointed, grayish seeds, while those of the allied species are larger, thicker, with rounded angles, and of a more reddish color.—GEO. ENGELMANN.

EPHEDRA ANTISTYPHILITICA, C. A. Meyer.

La Plata Valley, 5,500 feet.

EPHEDRA TRIFURCA, Torrey.

Mesa Verde and Animas Valley.

ABIES CONCOLOR, Lindl.

JUNIPERUS OCCIDENTALIS, Hook.

ZANNICHELLIA PALUSTRIS, L.

Cañon City—a very troublesome plant, growing in the irrigation-ditches.

EPIPACTIS GIGANTEA, Dougl.

San Juan Valley.

PROSARTES TRACHYCARPA, Watson, King's Rep., 344.

Sierra Sangre de Cristo and abundant in the La Plata Mountains.

ALLIUM ACUMINATUM, Hook.

La Plata and Animas Valleys, 8,000 feet.

YUCCA BACCATA, Torrey.

Southwestern Colorado—common at 8,000 feet altitude; growing at a higher altitude than *Y. angustifolia*.

FESTUCA TENELLA, Willd.

Cañon City.

STIPA PENNATA, L.

Cañon City.

ORYZOPIS ASPERIFOLIA, Mx.

Piedra Mountains, 9,000 feet.

GLYCERIA NERVATA, Trin.

Wet Mountain Valley.

AIRA FLEXUOSA, L.

Alpine—Sierra Sangre de Cristo.

EATONIA OBTUSATA, Gray.

Near Cañon City.

SETARIA CAUDATA, Roem. & Schultz.

Cañon City.

BOUTELOUA ERIPODA, Torrey.

San Juan Valley.

BOUTELOUA POLYSTACHYA, Torrey.

San Juan and Mancos Valleys.

MELICA STRICTA, Boland.

Parrott City, 8,500 feet.

ERAGROSTIS POÆOIDES, Beauv., var. *megastachya*, Gray.

Cañon City—introduced.

TRICUSPIS PULCHELLA, Torrey.

San Juan Valley.

CALAMAGROSTIS LANGSDORFFII, Trin.

Parrott City.

ANDROPOGON JAMESII, Torr.

San Juan Valley.

The following is a list of plants seen growing in Southwestern Colorado on the plains of the western slope below an altitude of 8,000 feet. As those of the higher altitudes are generally found throughout the

mountain-regions of the State, they are omitted, as are also those mentioned in the preceding list. It is of interest as a means of comparison with the flora of the eastern slope of the same altitude.

- Clematis ligusticifolia*, Nutt.
Vesicaria stenophylla, Gray.
Stanleya pinnatifida, Nutt.
Erysimum cheiranthoides, L.
Lepidium alyssoides, Gr.
Cleome integrifolia, T. & G.
Frankenia Jamesii, Torr.
Silene Menziesii, Hook.
Arenaria congesta, Nutt.
Malvastrum coccineum, Gr.
Sphaeralcea angustifolia, Spach.
Linum rigidum, Pursh.
Geranium Fremontii, Torr.
Pachystima myrsinites, Raf.
Ceanothus Fendleri, Gr.
Negundo aceroides, Moench.
Rhus glabra, L.
Rhus toxicodendron, L.
Trifolium longipes, Nutt.
Psoralea lanceolata, Pursh.
Petalostemon candidus, Mx.
Astragalus lonchocarpus, T. & G.
Glycyrrhiza lepidota, Nutt.
Hedysarum Mackenzii, Richards.
Lathyrus palustris, L.
Spirea dumosa, Nutt.
Rubus Nutkanus, Moq.
Rubus strigosus, Michx.
Purshia tridentata, DC.
Cercocarpus parvifolius, Nutt.
Geum Rossii, Seringe, alpine,
 flowers double.
Potentilla Anserina, L.
Rosa blanda, Ait.
Pyrus sambucifolia, Cham. &
 Schlecht.
Amelanchier alnifolia, T. & G.
Philadelphus microphyllus, Gr.
Oenothera biennis, L.
Oenothera albicaulis, Nutt.
Oenothera triloba, Nutt.
Oenothera Hartwegii, Benth., var.
Mentzelia nuda, T. & G.
Mentzelia multiflora, Nutt.
Mamillaria vivipara, Haw.
Echinocactus Simpsoni, Eng.
Cereus Fendleri, Eng.
Cereus phoeniceus, Eng.
Opuntia Camanchica, Eng. & Big.
Opuntia Rafinesquii, Eng.
Cucurbita perennis, Gr.
Kuhnia eupatorioides, L., var.
- Brickellia Californica*, Gr.
Diplopappus ericoides, T. & G.
Erigeron armeriaefolium, Turcz.
Erigeron Bellidiastrum, Nutt.
Solidago pumila, T. & G.
Bigelovia Howardii, Gr.
Bigelovia Parryi, Gr.
Bigelovia depressa, Gr.
Bigelovia Douglasii, Gr.
Aplopappus spinulosus, DC.
Aplopappus croceus, Gr.
Grindelia squarrosa, Dunal.
Chrysopsis villosa, Nutt.
Iva xanthiifolia, Gr.
Helianthus petiolaris, Nutt.
Helianthus lenticularis, Dougl.
Thelesperma gracile, Gr.
Ximenesia encelioides, Cav.
Gaillardia pinnatifida, Torr.
Actinella scaposa, Nutt.
Actinella Richardsonii, Nutt.
Achillea Millefolium, L.
Artemisia filifolia, Torr.
Artemisia tridentata, Pursh.
Artemisia Ludoviciana, Nutt.
Senecio aureus, L.
Tetradymia canescens, DC., var.
Stephanomeria minor, Nutt.
Pterospora Andromedea, Nutt.
Phelipæa Ludoviciana, Don.
Pentstemon glaber, Pursh.
Castilleja linariæfolia, Benth.
Orthocarpus luteus, Nutt.
Hedeoma Drummondii, Benth.
Monarda fistulosa, L.
Monardella odoratissima, Benth.
Dracocephalum parviflorum, Benth.
Echinosperrum deflexum, Lehm.,
 var.
Echinosperrum Redowskii, Lehm.
Heliotropium convolvulaceum, Gr.
Collomia longiflora, Gr.
Gilia pungens, Benth.
Calystegia sepium, R. Br.
Saracha Coronopus, Gr.
Nicotiana attenuata, Torr.
Apocynum cannabinum, L.
Asclepias speciosa, Torr.
Mirabilis oxybaphoides, Gr.
Mirabilis multiflora, Gr.
Allionia incarnata, L.
Abronia fragrans, Nutt.

Abronia cycloptera, Gr.
Cycloloma platyphyllum, Moq.
Atriplex patula, L.
Eurotia lanata, Moq.
Sarcobatus vermiculatus, Torr.
Eriogonum alatum, Torr.
Eriogonum Jamesii, Benth.
Eriogonum umbellatum, Torr.
Eriogonum cernuum, Nutt.
Shepherdia argentea, Nutt.
Euphorbia petaloidea, Englm.
Euphorbia Fendleri, T. & G.
Euphorbia montana, Englm.
Celtis occidentalis, L.
Quercus alba, L., var. *Gunnisoni*,
 Torr.
Salix longifolia, Muhl., var.

Populus angulata, Ait.
Populus balsamifera, L., vars.
Corallorhiza multiflora, Nutt.
Cypripedium parviflorum, Salisb.
Yucca angustifolia, Pursh.
Scirpus validus, Vahl.
Muhlenbergia pungens, Thurber.
Calamagrostis longifolia, Hook.
Eriocoma cuspidata, Nutt.
Pleuraphis Jamesii, Torr.
Phragmites communis, L.
Triticum repens, L.
Pteris aquilina, L.
Pellaea gracilis, Hook, La Plata
 Mountains.
Cheilanthes lanuginosa, Nutt.
Woodsia Oregana, Eaton.

LIST OF MUSCI AND HEPATICÆ COLLECTED IN SOUTHERN COLORADO,
 MOSTLY BETWEEN 5,000 AND 9,000 FEET ALTITUDE, DETERMINED BY
 E. A. RAU, WITH THE ASSISTANCE OF C. F. AUSTIN AND T. P. JAMES.

Weissia viridula, Brid.
Weissia cirrhata, Hedw.
Weissia crispula, Hedw.
Weissia crispula, var.—Plants much smaller than in usual forms; leaves
 dark green, with much closer areolation.—Sierra Madre of South-
 western Colorado.

Gymnostomum rupestre, Schwaegr.—Mancos Valley.

Gymnostomum Brandegei, Austin, new species, Bulletin Torrey Botanical Club, vol. vi, p. 46.—Cañon City.

Dicranum scoparium, L.—Southwestern Colorado.

Dicranum rhabdocarpum, Sulliv.

Dicranum (Campylopus) Rauei, nov. sp., C. F. Austin.

Caule brevi compacte cæspitoso inferne dense tomentoso-radiculoso;
 foliis erectiusculis, subtuosis, lineali-lanceolatis, semel tortis valde
 convolutis-concavis, dorso indistincte papillois margine ad apicem
 subserratis; costa angusta, excurrente; reti minuto cellulis angulari-
 bus perpaucis paulum inflatis; capsula subcylindrica, erecto-incurva
 pallida laeviuscula, seta brevi tenui flexuosa, operculo longe rostrato;
 annulo angusto, calyptra solum, operculi rostrum obtegente: color
 læte fulvo-virens. Colorado—1875—T. S. Brandege (Rau). About
 the size of *D. flagellare*. Leaves shaped about as in *D. flagellare*
 (costa more solid, otherwise similar); once twisted as in *D. Schraderi*,
 convolute-concave much as in *D. Muhlenbeckii*; reticulation much as
 in *D. fulvum*. Color, shape, and texture of the capsule also much as
 in *D. Schraderi*, but that has a straight and longer pedicel, much
 larger calyptra, lighter costa, and cells at the base of the leaf more
 lax, those above more granulose, margins more decidedly serrate, &c.,
 besides it is a much larger species.

Fissidens exiguus, Sulliv.

Desmatodon cernuus, Br. Eu.

Desmatodon latifolius, Br. Eu., var. β . *glacialis*.

Didymodon rubellus, Br. Eu.

- Distichium capillaceum*, Br. Eu.
Barbula ruralis, Hedw.
Trichostomum tophaceum, Brid.
Ceratodon purpureus, Brid.
Ceratodon purpureus, var. *xanthopus*.
Encalypta vulgaris, Hedw.
Encalypta vulgaris, var. *obtus*a.
Encalypta vulgaris, var. with leaves very obtuse, obovate oblong; costa shorter than in the preceding; peristome pale and fugacious. A fine variety, very distinct from the former, both in shape of the leaves and in the presence of a fine peristome.
Encalypta ciliata, Hedw.
Orthotrichum anomalum, Hedw.
Orthotrichum cupulatum, Hoffm., var. *minus*.
Orthotrichum Sturmii, H. & H.
Orthotrichum Kingianum, Lesq.
Orthotrichum Watsoni, James.
Coscinodon Wrightii, Sulliv.—Cañon City.
Coscinodon Rauei, Austin, new species, Bulletin Torrey Botanical Club, vol. vi, p. 46.—Cañon City.
Grimmia Brandegei, Austin, new species, Bulletin Torrey Club, vol. vi, p. 47.—Cañon City.
Grimmia obtusa, Schwaegr.
Grimmia calyptrata, Hook.
Grimmia anodon, B. & S.
Grimmia apocarpa, Hedw.
Grimmia apocarpa, var. leaves broader and shorter; peristome paler; teeth narrower.
Grimmia plagiopodia, Hedw.
Grimmia ovata, W. & M.
Tayloria serrata, B. & S.
Funaria hygrometrica, Hedw.
Funaria hygrometrica, var. *patula*.
Bryum pyriforme, Hedw.
 crudum, Schreb.
 nutans, Schreb.
 cernuum, Hedw.
 intermedium, Brid.
 cirrhatum, H. & H.
 bimum, Schreb.
 pallescens, Schwaegr.
 *caespiticiu*m, Linn.
 *argenteu*m, Linn.
 *obconicu*m, Hornsch.
 *pseudotriquetru*m, Hedw.
 *turbinatu*m, Hedw.
 *turbinatu*m, var. *latifolium*.
*Mnium cuspidatu*m, Hedw.
 affine, Bland.
 *serratu*m, Schrad.
Timmia megapolitana, Hedw.
*Polytrichum juniperinu*m, Hedw.
Fabronia Wrightii, Sulliv.—Cañon City.
 Wrightii, var. of a larger growth; leaves less strongly serrate.
Leskea polycarpa, Hedw.

- Pseudoleskea atrovirens*, Schwaegr., var. *brachycladus*.
Brachythecium denticulatum, Linn.
 rivulare, Br.
 collinum, Schp.
 collinum, var.
 Utahense, James.—Cañon City.
 Fendleri, Sulliv.—Cañon City.
Eurynchium strigosum, Hoffm.
 diversifolium, Br. Eu.
Amblystegium confervoides, Schwaegr.
 minutissimum, S. & L.
 serpens, Linn.
 orthocladon, Beauv.
 radicale, Brid.
 compactum, C. Mull.
Stereodon plicatile, Mitt.
Limnobium palustre, Br. Eu.
Hypnum filicinum, Linn.
 uncinatum, Hedw.
 reptile, Michx, var.
 curvifolium, Hedw.

HEPATICÆ.

- Marchantia polymorpha*, Linn.
Jungermannia pumila, With.
 trichophylla, Linn.
Scapania compacta, L.
Reboulia hemisphærica, Rad.





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